

**Program & Abstracts  
for the 9<sup>th</sup> Annual**

**Pacific  
Undergraduate  
Research &  
Creativity  
Conference  
PURCC-2009**

University of the Pacific  
Stockton, CA 95211

May 2, 2009

Sponsored by The Pacific Fund



# **Program**

## **Oral Presentations**

**9:00 AM – 12:30 PM**

**DeRosa University Center, Room 211A/B**

## **Poster Presentations**

**1:00 – 3:00 PM**

**DeRosa University Center, Ballroom B**

## **Engineering Senior Project Demonstrations**

**2:00 – 3:30 PM**

**School of Engineering & Computer Science**

## **Senior Art & Design Exhibition**

**“MMIX Media”**

**April 27 - May 16**

**Reynolds Gallery**

## **Junior Art Exhibition**

**“Your Piece of the Puzzle**

**April 27 – May 16**

**Art Studio Building**

## Oral Presentations

**Moderators: Dr. Edie Sparks Dr. Caroline Cox**

Time	Presenter	Title
9:00	Betsy Hammer	Art and the War in Iraq: Censorship, Patriotism, Propoganda, and Atrocity
9:20	Eliana Cetto	Gun-Slingin' Tarts and Sensitive Cowboys: <u>Johnny Guitar</u> and the Rare, Female Western
9:40	Madalyn Friedrich	Eva Gonzalèz: Modernity Through a Woman's Lens
10:00	Amanda "Ava" Villanueva	Chicana! Power, Art & Gender
10:20	Laura Yang	Snapshot: What Julia Margaret Cameron's Photography Reveals about the Gender Ideologies of 19 <sup>th</sup> Century Britain
10:40	Break	
11:00	Allison Duong	Behind the Caprice is the Criticisms
11:20	Lloyd Barba	How Revival Ministers Prepared Colonists for the American Revolution
11:40	Win McLaughlin	What Drove the Doctor: Medical Experimentation in the Holocaust
12:00	Nahila B. Ahsan	The "Hindoo" Invasion of the 20 <sup>th</sup> Century – Understanding a Misunderstood Group

**Poster Presentations**  
**Moderator: Dr. Lydia Fox**  
**1:00 – 3:00 PM**

Poster#	Author(s)	Title
1	Lauren Ehrhart	The Days of Lower Lamos
2	Rachael Freeman	Raising Voting Quality: A Review of Voting Errors, Literature and an Analysis of Steps in Reducing Those
3	George Brais	It's More Than You Think: <i>Euphoria</i>
4	Cheryl Zurbrick & Seth Urban	Adventures n Dimerization: An Exploration of Intermolecular Forces
5	Anne Fisher	What Coastal Marsh Sediments Reveal About Land Use Change; Bodega Bay, CA
6	Jason Dupere	The Impacts of Prescribed Fires on the Physical and Chemical Properties of Soils
7	Win McLaughlin	Sources of Water Quality Impairments in the Lincoln Creek Watershed, Lewis County, Washington
8	Kari McLaughlin	Deep-sea Corals as Archives of Past Ocean Acidification and Changes in the Ocean Minimum Zone
9	Cathya Acuña	Testing the Effectiveness of the High-Probability Instruction Sequence
10	Heather Breen	Expressive Writing: Does it Affect Academic Writing Skills?
11	Dianne Castellano, Andres Nunez, Lynda Sosa Lowry	"I Had to Look Like Britney Spears" Girl's Sexual Self Concept, Sexual Agency and Body Objectification in Adolescence

Poster#	Author(s)	Title
12	Seth Gomez and Jennifer Yau	The Search for Super-Secreters and the Secret to their Superpowers
13	Veena Vaidyanathan and Shelly Baath	DNA Isolation and Characterization of a novel fibroin from the black widow spider, <i>Latrodectus hesperus</i>
14	Eugene Han and Taryn Fong	The Splendor of Spider Silk
15	Ahra Cho and Mandeep Grewal	Identification of a New Wrapping Silk Protein from the Black Widow Spider, <i>Latrodectus hesperus</i>
16	Justine Fong and Minnie Cao	Exploring the Glue Between Spider Silks and Cancer
17	Titus Hou and Vanessa Chung	Analysis and Search of Silk Gene Proteins in <i>Latrodectus Hesperus</i>
18	Gerard Waworundeng	Identification of a New cDNA that Codes for Wrapping Silk in Black Widow Spiders
19	Jennifer Chau, Minh Tran, Anabelle Visperas	Hunting for new spider silk genes in the black widow spider, <i>Latrodectus hesperus</i>
20	Katelin Kehoe	Analysis of gene expression in <i>Trichomonas vaginalis</i> by DNA microarray technology
21	Raquel Sugino, Kristen Chang, Ajit Shokar, Steven Tu, Paul Sukhanov, Kristin Heller	Cloning and expression of a toxin-associated protein from <i>Clostridium botulinum</i> serotype E
22	Cathy Yen, Daniel Yee, Erica Lee	<i>In vitro</i> effects of meclonazepam analogues on the growth of <i>Trichomonas vaginalis</i>
23	Daniel Yee, Cathy Yen, Erica Lee	Chloroquinolyl Analogues as Potential Treatments for <i>Trichomonas vaginalis</i>

Poster#	Author(s)	Title
24	Kirstin M. Low, Lauren M. Conway, Raquel K. Sugino, Nimisha N. Patel	<i>In vitro</i> Effect of Sanguinarine and Chelerythrine on <i>Trichomonas vaginalis</i> Trophozoites
25	Richard Tran, Raquel Sugino, Marilynn Chow, Paul Geurts, Brad Butcher, and Jessica Cicone	Characterization of Serine Proteases in <i>Trichomonas vaginalis</i>
26	Chris Wakukawa, Larry Chen, Nathalie Foray, Raquie Sugino, Padraick Dornbush	<i>In vitro</i> effects of a chemical inhibitor targeting superoxide dismutase on the growth of <i>Trichomonas vaginalis</i>
27	Cynric Cho and Rhobe Bulahan	<i>In Vitro</i> Effects of a Vinyl Sulfone Cysteine Protease Inhibitor on a Virulent Strain of the Bovine Parasite <i>Tritrichomonas foetus</i>
28	Cynric Cho, Rhobe Bulahan, John Cabrerros, Katherine Grutas, Padraick Dornbush	<i>In Vitro</i> Effects of Alternative Chemotherapeutics on a Virulent Strain of the Bovine Parasite <i>Tritrichomonas foetus</i>
29	Ryan Nguyen, Henry Nguyen, Daniel Sorrick, Raymond Garcia, Chris Wakukawa, Larry Chen, Elizabeth Chang, Jessica Cicone, and Padraick Dornbush	3,4-Dichloroaniline Amides as Anti-trichomonal Agents: Structure Activity Analysis of a Compound Library <i>in vitro</i>

**Engineering Senior Design Project Demonstrations**  
**2:00 – 3:30 PM**

**Bioengineering**

<b>Author(s)</b>	<b>Title</b>
Tiffany Mateo, Joyce Opiniano, Olga Sirovskaya, Andrea Staggs, and Gwendolyn Upson	Not All Alloys are Created Equal: Recovery Temperature Testing Apparatus (RTTA)
Nick Rummel, Andre Bayati, Kamaldeep Singh, and Michael Jue	Automatic Pill Dispenser
Patrick Balingit, Thaer Elareer, Van Huynh, Dorothy Phan, and Edison Tongsoni	Project FFR
Josephine Trinh, Zack Kimura, Chris Stanton, Jocelyn Gray	Team Reachout: Creating Memories that Last a Lifetime
Dustin Dovala and Jeff Lee	Manually Powered Otoscope

**Civil Engineering**

<b>Author(s)</b>	<b>Title</b>
Steve Carrick	Solar Panels Over Brookside Parking Lot
Gary Mohler, Korey Marr, Peter Williams, and Victoria Doyle	Rehab of a North Stockton Tiltup Building
Grant Hollis, Peter Tran, Navin Grewal, Blanca Flores, Charles Falzone, and David Bushnell	1-D Shake Table to Simulate Earthquakes
Christina Ramirez, Alvin Tan, James Edwards, and Hayley Cook	Asset Management Analysis of Corte Madera CA Waste Water System
Kyla Mahowald, Feliciano Leon, Brent Kawahara, Matthew Young, and Ben Garcia	Design of a Roadway in Roseville, CA
Eric Rowland, Kyle Davie, Roy Cormier, Sayer Al-Sayer, Nick Nelson	Analysis of the Expansion of the Pleasant Grove Wastewater Treatment Plant in Roseville, CA



### Computer & Electrical Engineering and Engineering Physics

Author(s)	Title
Tabitha Voyteck, Casey Carlin, Patrick Hall, and Ross Bennett	Cavendish Gravity Experiment: A Setup Modification
Ra Meas, Alex Perez, Rashid Al-Naimi, and David Van Teslaar	The Wonderlic Motion Contraption – Exercise Repetition Counter
Steven Girard, Mike Lagomarsino, Thomas McDonald, Vicky Pang, and Sean Pippin	Energy and Power
Marc Sakai, Seyla My, Jonathan Crawford, and Justin Ouye.	Save Money on Your Energy Bill: Power/Energy Meter Design by Team MSJ <sup>2</sup>
Brandon Blair, Nate Mackey, Kulwinder Samra, and Bryan Weimer	Knowledge is Power: Regaining Control from the Rebel Appliance

### Mechanical Engineering

Author(s)	Title
Benjamin Alldritt, Liza Boyle, Justin Canty, and Douglas Nelson	iFire Automated Fire Suppression System
Brandon Coonce, Gabriel Corona, Jared Englebrecht, and Jonathan Thomas	Mars Rock Crawler
Abdullah Al-Attal, Matthew Furlo, James Gannatal, and Christopher Hewitt	Omni-Directional Vehicle
Robyn Nariyoshi, Clemment Nguyen, Tejpal Sekhon, and James Smyth	Principles of Engineering Machine

**Senior Art & Design Exhibition: “MMIX MEDIA”**  
**April 27 – May 16**  
**Reynolds Gallery**

Artist	Titles
Lauren Carter	The Object’s Function
Eliana Cetto	Silent Stories
Katherine Draeger	Coyote Speaks
Jessica Herrera	Imagining the Spiritual
Susannah Pilcher	Obtainable Sustainable
Gina Polana	A New Way of Living
Lisa Tran	Functional Ceramics and Lidded Forms
Brandi Young	Happily Ever After? The Commercialism of Fairytales and the Shaping of Feminine Identity

Other artists presenting:

Graphic Design: Gabriela Aschenberg, Chris Baum, Wojciech Marek, Hareem Cheema, Lamar Gibbs, Luis Gonzalez, Sarah Gutierrez, Lindsey Hart, April Ledbetter, Heather McCoy, and Adrienne Ross.

Studio Art: Jean Frost, Minh Ho, and Valerie Grissom

**Junior Studio Seminar Exhibition: “Your Piece of the Puzzle”**  
**April 27 – May 16**  
**Studio Art Building**

Artist	Title
Brooke Cashion	Three Person Vessel Xylophone
Yolanda Cunningham	Atonement
Christine Strain	Miscommunication



# Oral Presentations



**Oral Presentation: 9:00****Art and the War in Iraq: Censorship, Patriotism, Propaganda, and Atrocity**

Betsy Hammer

This paper analyzes the responses of American and European artists to the War in Iraq, specifically their treatment of issues such as: censorship, propaganda and patriotism, government leadership and ineptitude, and atrocity and torture. Nearly all the art created about the war has been negative, often blaming the United States government. In order to understand the artists' selection of subject matter, I analyze the role of the media in introducing the majority of images about the war; from imbedded journalists to dissenters who blogged about Abu Ghraib. The Internet has been an integral part of this phenomenon, as it has opened new possibilities of sharing information and images that did not previously exist. I compare the artistic responses to the Iraq War with the ways in which artists responded to previous armed conflicts, revealing that the current reaction has been much more subdued. The reasons for the overwhelmingly negative response to this armed conflict will be explained, in part, by the belief among artists that truth was one of the war's first casualties.

**Faculty Mentor:** Merrill Schleier**Oral Presentation: 9:20****Gun-Slingin' Tarts and Sensitive Cowboys: Johnny Guitar and the Rare, Female Western**

Eliana Cetto

Johnny Guitar (1954) is a rare, female Western, based on the story of a small, corrupt Arizona community and a new property owner, Vienna (Joan Crawford). The town is dominated by the two main female characters of Vienna and Emma (Mercedes McCambridge); they call every shot, make every decision, and have men who follow them. The gender performances of both women are examples of coded lesbianism, which is adopted in the film to show their power and success in a man's world. Their masculine appearances and cold glances at men create on-screen innuendos, referring to their butch identities. The main male characters are, in turn, feminized, creating very sensitive and emotional cowboys, who dance, sing, and abide by their women. Not fully adopting homosexual characteristics, the resolution for the "queered" female characters lies in their ability to simultaneously be heterosexual damsels-in-distress, waiting for an opportunity to be turned back into women by the men who love them. Thus, even though the main characters' queer characteristics subvert the status quo in the traditional Western, heteronormativity is restored at the film's conclusion.

**Faculty Mentor:** Merrill Schleier

**Oral Presentation: 9:40****Eva Gonzalès: Modernity Through a Woman's Lens**

Madalyn Friedrich

In contrast to critics who have categorized nineteenth-century French female Impressionist artists as derivative or influenced by their male counterparts, I argue that Spanish-born artist Eva Gonzalès initiated a distinctive vision. Building on art historian Griselda Pollock's discoveries of woman artists' unique perspective in relation to spatiality, and their reworking of depictions of the female body, I argue that Eva Gonzalès explores modernity through a woman's perspective and through the empowered female subjects in her paintings. Her depiction of nineteenth-century female experience is related to Pollock's analysis of space: what locations women were permitted, how women artists used formal space in their art, and how the gaze was incorporated into their artwork. Gonzalès captured moments of modernity through a "woman's lens" in scenes at the millinery shop and at the opera to explore the unique ways a nineteenth-century woman experienced the city. Gonzalès's scenes were different from her male contemporaries; her women are assertive, creative, intelligent, and above all, demand a certain respect.

**Faculty Mentor:** Merrill Schleier

**Oral Presentation: 10:00****Chicana! Power, Art & Gender**

Amanda "Ava" Villanueva

The Mexican American civil rights and the feminist movements both began in the late 1960s. Despite both group's claims to include everyone, Chicana women felt displaced in the former, often expected to merely serve as sexual outlets for the male leaders to vent frustrations, or as the "uneducated, lower class help" in the latter. One group of women artists' known as Las Mujeres Muralistas subverted these notions and through their art created a voice for Chicanas that coincided with the ideals of *El Movimiento*, while rebelling against patriarchal privilege. With their use of female-centered subject matter with hidden scenes of Chicano folklore and contemporary cultural oppression, Las Mujeres Muralistas grew as empowered figures within the Chicano community, the feminist movement, and the art world in general.

**Faculty Mentor:** Merrill Schleier



**Oral Presentation: 10:20****Snapshot: What Julia Margaret Cameron's Photography Reveals about the Gender Ideologies of 19<sup>th</sup> Century Britain**

Laura Yang

Julia Margaret Cameron (1815-1879) was an audacious British photographer at a turning point in art and gender history. It was only in the last fifteen years of her life that Cameron received a rudimentary camera and set her artistic career into motion. Her photographs document the lives of many well-known people of her time, but her images simultaneously serve as statements of the gender attitudes present during her lifetime and epitomize the contradictions of the woman artist in the Victorian era. By analyzing the subject matter that is portrayed within her images in the context of the age in which she lived, the formal elements of her art, and Cameron's own class background, it becomes clear that Cameron's graphic work is a representation of the role of women in the late nineteenth century and Cameron's own struggle to reconcile her art and gender identity.

**Faculty Mentor:** Merrill Schleier

**Oral Presentation: 11:00****Goya's *Caprichos*: Behind the Caprice Is the Criticisms**

Allison Duong

This research paper analyzes four prints by the eighteenth-century Spanish artist, Francisco de Goya. In the late eighteenth century, Spain went through considerable social and political turbulence. The nation was behind its European cousins, France and England, in modernizing and it was also on the brink of invasion from Napoleon's army. I will analyze Goya's *Caprichos* and show that the prints demonstrate Goya's belief in modernization and what he took to be Spanish social institutions' idleness toward modernization. For this paper, the majority of the visual analysis is my own interpretation, but I will also use primary and secondary sources to support my analysis and my thesis. The purpose of this research is to alert the audience to the correlation between art and the society that produces it using Goya's works in eighteenth-century Spain as a case-study.

**Faculty Mentor:** Bett Schumacher

**Oral Presentation: 11:20****‘Revivalution’: How Revival Ministers Prepared Colonists for the American Revolution**

Lloyd Barba

*1 Corinthians 10:29**... for why is my liberty judged of another man's conscience?*

For nearly half a century before the American Revolution, the preachers of the Great Awakening swept through the thirteen colonies, transforming individuals' lives in an unprecedented phenomenon known as the Great Awakening. The clergy during the Great Awakening proved to be instrumental and provided the very groundwork for the Revolution in three ways. First, the clergy of the Great Awakening provided an example of dissent from England that was later followed by the Revolutionaries. Second, the clergy united the American social classes and religious audiences. Third, the Clergy provided the language for the Revolution. Paradoxically, while the Great Awakening was the first phenomenon to create inter-colonial unity and rapport, it was also the first phenomenon to create dissention between English people and American people. In this paper I will delve into the three aforementioned ways as to how ministers before the Revolution prepared the colonies for the American Revolution.

**Faculty Mentor:** Monica Fitzgerald**Oral Presentation: 11:40****What Drove the Doctor: Medical Experimentation in the Holocaust**

Win McLaughlin

Medical experimentation was one of the worst atrocities of the Holocaust inflicted upon concentration camp victims by the perpetrators of Nazi Germany. However, unlike many of the perpetrator positions, almost all of the Doctors who participated were willing and volunteered for their duties. This paper will examine what motives could have possibly driven medical professionals to commit this horrible disregard of human life and suffering. Furthermore, they often justified their actions with the reasoning they were advancing science. In the context of Eugenics science in the 1930's, the Doctors actions are not excusable, but their motivations are at least plausible. It is argued that some true knowledge came from the experiments, however even if a new advancement was discovered, the ethics of using such data are often called into question.

**Faculty Mentor:** Gesine Gerhard

**Oral Presentation: 12:00**

**The “Hindoo” Invasion of the 20<sup>th</sup> Century-Understanding a Misunderstood Group**

Nahila B. Ahsan

Oscar Handlin once wrote, “I thought to write a history of the immigrants in America. Then I discovered that the immigrants were American history.” The United States has served as a major receiving country for immigrants for centuries. Research about immigrants is often divided into broad categories and experiences, such as Asian, Latino, Middle Eastern, European, and African. We should be careful not to group immigrants into broad categories since many of them represent different cultures, ethnic groups, etc. In this paper, I will explore the immigrant experiences of the Muslim Punjabis, an ethnic group from present day India and Pakistan, in the U.S. between 1907 and 1970.

Because South Asia is a broad geographical region, I will attempt to isolate the immigrant experience of the first immigrants who came from this region: Punjabi Muslims. In order to understand this immigrant experience, it is crucial to understand conditions in the home country, such as British colonialism, conditions in the United States, immigration laws, cultural and religious practices, and their new way of life in the U.S.

Muslims and South Asians have had a strong presence in American society and media, but how much do Americans really know about them? South Asians and Muslims have been misunderstood since they first arrived in this country over a century ago. By exploring the experiences of Punjabi Muslims, we will learn a part of American history that has been left out and study the experiences of this immigrant group more in depth.

**Faculty Mentor:** Jennifer Helgren



# Poster Presentations



**Poster # 1****The Days of Lower Lamos**

Lauren Ehrhart

This spring I conducted oral histories pertaining to the first generation Lebanese American experience. The people being interviewed were my grandfather Phil Daher and his siblings Joe and Sally. I asked them to depict their childhoods as first generation Lebanese Americans. The stories that were once softened with humor, during my own childhood, grew coarser as I learned of both the economic and culturally based social struggles the three faced as children and then young adults.

This presentation focuses on the discrimination that both Adele (their mother) and Sally faced as women while living within the traditional Lebanese household run by Barbar Daher. Even while living within the United States they work under the domination of men – handing over wages and taking beatings. Yet both are strong women who attempt to gain freedom. Within the storyline I have chosen to highlight my Aunt Sally's story, a daughter who learns from her mother's life, and ultimately stands up for the freedom that she deserves.

The oral histories were told to me in the form of stories. All three children used humor to soften the graphic images that they were sharing. It was this combination of imagery and humor that inspired me to present the oral histories as a comprehensive graphic novel. I felt that illustrations allowed me to present the story in a detailed but engaging manner, and allowed me to incorporate the same jokes that they turned to in darker times.

**Faculty Mentor:** Jennifer Helgren

**Poster # 2****Raising Voting Quality: A Review of Voting Errors, Literature and an Analysis of Steps in Reducing Those Errors**

Rachel Freeman

A comprehensive review of literature on reducing voter errors was conducted to assess the prior research conducted in areas of voter education, poll worker training, and quality of ballots cast on Election Day. This review found that academic literature on reducing voter errors is very limited. Based on the review of literature and personal observation and interviews, the study proposed seven recommendations for San Joaquin County Registrar's Office. It is expected an implementation of these recommendations will greatly reduce voter errors and raise the quality of voting. In addition, the study proposed an education module which calls on more involvement of college students during Election Day. A discussion of implication, limitation and suggestions for future research is also provided.

**Faculty Mentor:** Qingwen Dong

**Poster # 3****It's More Than You Think: *Euphorah***

George Brais

It all began with my first love. She eventually became my greatest muse, and through that relationship, I was inspired to do more than just write and perform music. It was the working through of the heartache of losing her that gave birth to *Euphorah*. *Euphorah* is a multimedia, interdisciplinary art form that combines multiple mediums (music, drama, poetry, visual art, dance, etc.) to create an experience that explores various emotions and inspires both the audience and the artists to deepen their spirituality and change their perspectives on the world. It began as a sign of love for a girl but was expanded to show everyone that the world can change.

Ultimately, I want the audience to see the world through the eyes of a child while maintaining the knowledge of an adult. This way, they can understand the world and still be in awe of it.

Also, my goal is not to just entertain or move the audience; it is also to create an environment for my artists to express themselves through synergy in ways they otherwise could not find.

*Euphorah* provides a space and time for people to experience something they are not used to and challenges them to dig deeper into themselves. Doing something different sometimes means walking down your path alone. Yet, I have so much faith in this project; I would be willing to continue the walk alone until I convince the world it can change. Lucky for me, I am no longer alone.

**Faculty Mentor:** Cathy McClellan**Poster# 4****Adventures in Dimerization: An Exploration of Intermolecular Forces**

Cheryl Zurbrick and Seth Urban

One of the oldest synthetic dyes, Rhodamine 6G was used in the first flashlamp-pumped dye laser as well as the first continuous-wave dye laser. Applications today utilize its fluorescing capabilities in biochemical research, and its photophysical properties in modern dye lasers. However, Rhodamine 6G in solution readily forms dimers, which affect laser efficiency. This investigation seeks to understand what kinds of intermolecular forces cause dimerization of this dye in aqueous solution. Utilizing visible spectroscopy, absorbance spectra of Rhodamine 6G in aqueous solution were studied as a function of temperature. As temperature increases, the monomer to dimer ratio increases, indicating that dimer formation is exothermic. Using DATAN software algorithms to analyze the change in monomer to dimer absorbance spectra ratios from 20 to 80 °C, the equilibrium constant for the process at 25°C is found to be about  $5 \times 10^3$  which corresponds to an approximate  $\Delta G^\circ$  of -20 kJ/mol. Utilizing this data, a constant  $\Delta H^\circ$  from 20 to 80 °C is found to be about -40 kJ/mol, in agreement with the expectation that dimer formation is exothermic. The value of  $\Delta G^\circ$  is similar in energy to weak bond formation, implying that a combination of electrostatic and van der Waals forces are what drive Rhodamine 6G to dimerize. Furthermore, literature on Rhodamine 6G structure suggests the existence of two different dimer conformations, whose forces are in agreement with our findings. Future studies of these structures are the key to minimizing their existence and thereby optimizing laser efficiency.

**Faculty Mentor:** Silvio Rodriguez



**Poster # 5****What Coastal Marsh Sediments Reveal About Land Use Changes: Bodega Bay, CA**

Anne Fisher

The Rail Ponds coastal marsh was separated from Bodega Harbor in 1963 when Westside Road was constructed. As a result, the marshes are now less tidally influenced, have brackish water, and contain more dense vegetation. My project explores the impacts of road construction on the Rail Ponds marsh using grain size and color analyses and also evaluates biological indicators of a transition in the marsh. Coastal wetlands are an important terrestrial carbon sink, since primary productivity is high and carbon is stored at high rates by the anoxic sediments. However, land use change in California has played a large role in the destruction of coastal wetlands: over 80% have been filled or diked to make way for agriculture, urban development, or salt production. This study explores the effects of land use change on coastal wetlands in terms of sediment deposition, biological productivity, and carbon storage.

**Faculty Mentor:** Laura K. Rademacher, Tessa Hill (UC Davis) and Sarah B. Myhre (UC Davis)

**Poster # 6****The Impacts of Prescribed Fires on the Physical and Chemical Properties of Soils**

Jason Dupere and Win N. McLaughlin

Although wildfires result in tremendous financial and sometimes human losses, they also provide essential ecosystem services to forests or other wildland areas. Lightning naturally ignites wildfires, which clean out underbrush and minimize fuel load. However, over one hundred years of fire suppression has left forests accumulating fuel and susceptible to large-scale destructive fires. As the ever-increasing population of California drives people closer to these wildland areas, the chance for human ignited fires increases.

As a result the growing fuel loads and increasing risk to populations, forest managers now actively manage many forested regions to reduce fuel load and minimize the likelihood of catastrophic wildfires. This study investigated the impacts of two fire management strategies (localized pile intense burning and regional mild broadcast burning) in two forest types (old growth and secondary growth) on the soil environment.

Soil tests of biogeochemical properties were performed pre-, one year post-, and two year post-fire to observe initial impacts and subsequent recovery of fundamental properties including hydrophobicity, infiltration rate, and grain size distribution. Results indicate that management strategies and forest types result in differing magnitude of initial changes soils, as well as differing rate of longer-term recovery.

Future work will incorporate carbon and nitrogen analyses and mineralogical analysis (results pending) to determine nutrient availability, ecosystem recovery, and sediment weathering. This project is an integral piece of ongoing research that will contribute new insights into how best to manage forests to minimize fire risk and maximize natural ecosystem functions.

**Faculty Mentors:** Laura K. Rademacher and Terri Hogue (UCLA)

**Poster# 7****Sources of Water Quality Impairments in the Lincoln Creek Watershed, Lewis County, Washington**

Win N. McLaughlin, Christopher J. Brown, Jacob Uber (UBC)

Drinking water quality is of growing concern in Washington with contaminants such as nitrate being common drinking water impairment, especially in rural areas. Nitrate and phosphate contamination commonly originate from urban and agricultural runoff. This study focuses on groundwater and surface water in the Lincoln Creek watershed in Eastern Lewis County Washington, where elevated nitrate and salinity impair water resources. The goal of this study is to investigate possible sources of water quality impairments in this region. Groundwater and surface water samples were collected during July/August 2008 and December/January 2008-2009. Surface water conductivity ranges from 0.09 to 0.20 mS/cm in the summer and 0.07 to 0.08 mS/cm in the winter. Discharge was elevated during the winter sampling due to recent precipitation events. Conductivity of sampled groundwaters ranged from 0.17 to 9.40 and 0.06 to 6.40 mS/cm in the summer and winter, respectively. Wells located within 100 meters of the stream have conductivities comparable to that of surface waters. Higher ( $>2.0$  mS/cm) conductivity values were typically observed in the deeper wells, which may penetrate the lower aquifer. Geochemical analysis of sampled groundwaters indicates that sodium and chloride are the primary ions in high conductivity groundwaters, consistent with communication with the deeper aquifer. Nitrate and phosphate concentrations in sampled surface waters and groundwaters are low,  $< 0.3$  ppm phosphate and  $< 1.2$  ppm nitrate. Preliminary results suggest that communication with the deep aquifer is the primary source of water quality impairment in the Lincoln Creek watershed.

**Faculty Mentor:** Laura K. Rademacher

**Poster # 8****Deep-sea Corals as Archives of Past Ocean Acidification and Changes in the Oxygen Minimum Zone**

Kari McLaughlin

The extent of the ocean oxygen minimum zone (OMZ) varies with sea surface water temperature and ocean circulation. In addition, increasing CO<sub>2</sub> in the atmosphere leads to increased seawater CO<sub>2</sub>. This combination leads to the dissolution of CaCO<sub>3</sub>, which many organisms depend on for their shells. Developing a proxy for past ocean  $\Sigma\text{CO}_2$  and [O<sub>2</sub>] is crucial to understanding oceanic response to future natural and anthropogenic environmental changes.

Deep-sea bamboo corals contain annual growth bands in calcite internodes and may provide high-resolution paleo-oceanographic records of environmental conditions. We examined the response of U/Ca incorporated into modern bamboo coral internodes collected from intermediate water depths (800-2000 m) in the eastern Pacific Ocean to  $\Sigma\text{CO}_2$  and [O<sub>2</sub>] in ambient seawater. Seawater  $\Sigma\text{CO}_2$  and [O<sub>2</sub>] was determined from the World Ocean Circulation Experiment (WOCE). Three samples were collected from each of the study corals: exterior, middle, and interior of the specimen. Corals were drilled in 1.50 millimeter wide samples, integrating ~15 years of coral growth.

U/Ca in corals were analyzed by inductively coupled plasma-mass spectrometry. U/Ca ratios varied both between corals and along the growth axis within individual corals. The U/Ca ratios ranged from 0.01 to 0.03  $\mu\text{mol/mol}$ . U/Ca ratios varied from .012 to .021  $\mu\text{mol/mol}$  within individual corals, suggesting considerable variation through time. The exterior coral sample U/Ca ratios measured on the ICP-MS were compared to WOCE data and found to positively correlate; thus, U/Ca ratios of deep-sea corals may serve as an effective archive of oceanic environmental conditions over the past several hundred years.

**Faculty Mentors:** Laura K. Rademacher, Tessa Hill (UC Davis), Kristina Faul (Mills College, Sarah Myhre (UC Davis), Howard Spero (UC Davis)

**Poster # 9****Testing the Effectiveness of the High-Probability Instruction Sequence**

Cathy Acuña

Compliance to instructions is a necessary component of skill acquisition procedures and learning. Although such techniques as physical prompting and time-out are used to increase compliance and decrease noncompliance, indirect methods may be favorable over direct, to reduce problem behaviors that may occur as a result of physical interaction. The high-probability instruction sequence is a procedure designed to help increase compliance without physical contact. It is based on the concept of behavioral momentum, where compliance to a series of high-probability (high-*p*) commands (i.e., a command that is complied with at least 90% of the time it is given) immediately prior to a low-probability (low-*p*) command (i.e., a command that is complied with at most 10% of the time it is given) increases the probability of compliance to the low-*p* command. Previous research has tested the effectiveness of the high-*p* instruction sequence by manipulating antecedents and stimuli present during the sequence (Bullock & Normand, 2006; Kestner, Normand, & Jessel, 2008). The purpose of the current study was to evaluate the high-*p* instruction sequence on compliance. It was hypothesized that if deterioration of compliance to high-*p* instructions occurred, changes in compliance would occur when stimuli present during the sequence were manipulated. Compliance to high-*p* instructions during the sequence did not deteriorate, but did show to increase compliance to low-*p* instructions. These results are similar to current literature that has also shown the effectiveness of the high-*p* instruction sequence on increasing compliance to low-*p* instructions (Bullock & Normand, 2006; Mace et al., 1988; Patel et al., 2007; Wilder et al., 2007).

**Faculty Mentor:** Matthew P. Normand**Poster # 10****Expressive Writing: Does it Affect Academic Writing Skills?**

Heather Breen

Expressive writing (EW) is associated with decreases in stress and symptoms of depression and anxiety among college students. EW is also frequently assigned as an informal writing assignment (e.g., "journaling") in academic classes, although little is known about the effects of EW on academic writing. This study investigated whether a 3 day, 20 minute expressive writing intervention could alter the academic/formal writing skills for students with differing levels of writing aptitude as determined by their SAT writing scores. To assess writing changes, students were asked to write a short academic essay before and after the 3-day intervention. A repeated-measures ANOVA will be calculated to see if there is any difference in individual writing after the intervention, and an independent measures ANOVA will be calculated to see if any group of student (high, mid, or low SAT writing scorers) demonstrated an overall change in their final essay. Implications for future use and limitations of the current research will be discussed.

**Faculty Mentor:**Carolynn Kohn

**Poster # 11****"I had to look like Britney Spears" Girls' Sexual Self Concept, Sexual Agency and Body Objectification in Adolescence**

Dianne Castellano, Andres Nunez, Lynda Sosa Lowry

Body objectification in girls has been found to be directly linked to mental health disorders such as depression and body disorders (Fredrickson & Roberts, 1997; Tolman, Impett, Tracy, & Michael, 2006). Researchers, using a feminist development framework, have also shown correlations between body objectification, sexual self efficacy, and sexual experience (Impett, Schooler & Tolman, 2006). It was found that suppression of needs and objectification of body predicts a higher chance of being involved in risky sexual behaviors. However, there is limited research available in areas focusing on the possible relationship of sexual self-concept and body objectification. In the present study, the relationship between sexual self-concept, sexual agency and body objectification was examined. A total of 144 girls participated in a longitudinal study; each girl was surveyed and interviewed in the 12<sup>th</sup> grade. The results revealed that the girls who objectified their body less reported a higher sexual self-concept. In order to further illustrate the different patterns between sexual self-concept and body objectification, qualitative analyses were done on an interview of one girl from the sample who portrayed high levels of sexual self concept and high levels of body objectification. For example, statements such as "I felt like I had to look like Britney Spears" were used to demonstrate body objectification while quotes like, "every time I wanted it, I got it... like I really want to get a vibrator, and like experiment with that stuff" were used to demonstrate her level of sexual self-concept.

**Faculty Mentor:** Deborah Schooler

**Poster # 12****The Search for Super-Secreters and the Secret to their Superpowers**

Jennifer Yau and Seth Gomez

*Pichia pastoris* is a strain of yeast often used by academic and commercial laboratories as a source for heterologous protein expression. However, despite its ability to produce specific proteins, *P. pastoris* is unable to efficiently express and secrete certain proteins, such as the  $\beta$ -galactosidase enzyme, in substantial amounts. Prior to this current project, a random mutagenesis was conducted using Restriction Enzyme Mediated Integration, 18 strains were isolated and found to be potential super-secretors of  $\beta$ -galactosidase. Our objective was to unravel the secret identity of the disrupted gene in order to illuminate the secretory mechanisms. Genomic DNA with the mutation from super-secreter strains AH14-4 and AH8-2 was isolated, sequenced, and analyzed. Through BLAST analysis, the disrupted gene in the mutant strain AH8-2 may be responsible for a golgi matrix protein, while the disrupted gene in mutant strain AH14-4 may be a non-essential subunit of the exocyst complex. This project provides knowledge about *P. pastoris*'s secretory machinery which could lead to improvements which make *P. pastoris* a more "powerful" system for heterologous expression.

**Faculty Mentor:** Joan Lin-Cereghino and Geoff Lin-Cereghino

**Poster # 13****DNA Isolation and Characterization of a novel fibroin from the black widow spider, *Latrodectus hesperus***

Veena Vaidyanathan and Shelly Baath

Spider silk has been under intense research in recent years due its high tensile strength, extensibility and toughness. Silk also has several other desirable molecular features, including its biocompatibility and non-toxic nature. Scientists have taken particular interest in the expression, assembly, and spinning processes of silk to serve the environment in the future for a variety of different applications. Using a cDNA library prepared from the silk-producing glands of the black widow spider, *Latrodectus hesperus*, we searched the library for novel cDNAs that encoded for members of the spider silk family. Twenty-five different plaques were randomly isolated, amplified and their recombinant viral chromosomes were treated with a helper virus to release the plasmid carrying the cDNAs from the viral chromosome. After retrieval of the plasmids carrying the cDNAs from the library, we confirmed the presence of cDNAs in the cloning vectors by performing restriction digestion analysis. Following the validation of the presence of cDNA inserts, the plasmids were sent off for DNA sequencing. Using bioinformatics to analyze the DNA sequences of the cDNAs in the cloning vector, we found that one clone encoded a novel fibroin family member. This cloned contained the hallmark signatures for fibroins, including the conserved, non-repetitive C-terminus and internal repeats .

**Faculty Mentor:** Craig Vierra

**Poster # 14****The Splendor of Spider Silk**

Eugene Han and Taryn Fong

Spider silk is a versatile protein fiber with a wide variety of uses. It possesses special characteristics such as high tensile strength, flexibility, and is extremely lightweight. Because of these characteristics, our research has been geared towards effectively synthesizing silk proteins. In our studies, we used a cDNA library produced from silk-producing glands of the black widow spider to randomly isolate recombinant viruses carrying different spider genes. After removing the cDNAs from the viral chromosome, which led to plasmids carrying the spider silk genes, we sequenced the unknown spider silk genes in order to determine their significance/relevance spider silks. Starting with 50 randomly selected clones, only 35 were able to be sequenced after removal from the viral chromosome. From the 35 sequenced cDNAs, one of the most promising sequences was selected for further investigation. This sequence showed similarity to a collagen fiber protein that was deposited in the nrNCBI protein database and could possibly be involved in the formation of silk fibers.

**Faculty Mentor:** Craig Vierra

**Poster # 15****Identification of a New Wrapping Silk Protein from the Black Widow Spider, *Latrodectus hesperus***

Ahra Cho and Mandeep Grewal

Spider silks are beginning to be extensively studied for their commercial uses due to their notably high tensile strength, extensibility and toughness. Mechanical studies have demonstrated that spider silks are 5 times stronger than steel. Using spider silk for other applications is being considered as well, such as their use for making artificial tendons and ligaments. In addition, they are currently be considered for use as materials for surgical threads, bandages, textiles, nets, parachutes, seat belts, air bags, ropes and sporting goods. In our studies, a cDNA library prepared from the silk producing glands of the black widow spider, *Latrodectus hesperus*, was screened to identify new silk genes. For our approach, we randomly selected twenty-five plaques from our cDNA library, amplified these plaques, and then excised their viral chromosomes using helper viruses to release the plasmids and their corresponding cDNAs from the viral chromosome. Following plasmid DNA retrieval, we performed restriction digestion analysis and examined the products using agarose gel electrophoresis to determine whether the vectors carried cDNA inserts. After validating the plasmids carried cDNA inserts, we performed DNA sequencing and then analyzed the retrieved spider gene sequences using bioinformatics. Our results revealed that one particular clone from our cDNA library screen encoded for a protein found in wrapping silk. Translation of our retrieved cDNA revealed it was rich in glycine and alanine, but surprisingly it didn't share some of the distinct features of the traditional silk family members. Collectively, these results indicate that wrapping silk likely contains non-traditional silk proteins.

**Faculty Mentor:** Craig Vierra

**Poster # 16****Exploring the Glue Between Spider Silks and Cancer**

Justine Fong and Minne Cao

*Latrodectus hesperus* (black widow) spider silk is known for its high tensile strength and toughness. Its lightweight and biodegradable properties also add to its appeal of potential commercial applications, such as durable ropes and sutures. However, because black widow spiders are cannibals, we cannot merely invest in spider farms. Instead, our reliance on spider silk as a marketable raw material is contingent upon the ability to generate either transgenic bacteria or yeast to mass-produce these silks in a more economical manner. One of the key tasks in accomplishing this goal is elucidating the genetic sequences that code for these fibroins.

Past protein analysis of *L. hesperus* silk fibers has characterized them as long and primarily composed of repetitive peptide motifs. The nature of these physical attributes makes copying the genes by rapid cloning strategies, such as polymerase chain reaction, an unfeasible task. Therefore, we have resorted to randomly isolating partial gene sequences from a cDNA library for all seven silk-producing abdominal glands, and comparing the theoretical translations of these partial sequences with MS/MS data for actual peptide sequences obtained after tryptic digestion of solubilized spider silk fibers. Although none of the translated partial cDNAs of this experiment matched the results from MS/MS analysis, nucleotide and protein BLAST searches did identify three genes of interest for further study: an aggregate glue (JYF23), the Ras protein (JYF13), and the minor ampullate spidroin (MC18).

**Faculty Mentor:** Craig Vierra**Poster # 17****Analysis and Search of Silk Gene Proteins in *Latrodectus Hesperus***

Titus Hou and Vanessa Chung

*Latrodectus hesperus* is commonly known as the black widow spider. The different silk fibers it produces are extensively studied to enable large-scale commercial applications. Its soluble nature, high tensile strength, toughness, and biodegradability provide promising advancements and improvements to current products. However, many crucial aspects of the silks and their properties have yet to be discovered or fully analyzed to allow these applications. In hopes of obtaining new silk genes that could be utilized to produce synthetic silk in bacteria or yeast, a cDNA library was created from the silk-producing glands of the black widow spider. The cDNA library was then plated out and random recombinant viruses were isolated. The amplification, excision, and digestion of plasmid cloning vector embedded in the viral chromosome was then carried out, isolating the individual plasmids carrying the cDNAs for DNA sequencing. With the use of translational programs, protein BLAST algorithms, nucleotide BLAST programs, the protein sequences and their identities could be determined. Translated cDNA sequences were then compared to a list of generated peptide sequences obtained from mass spectrometry. Identical matches showed that the translated cDNAs were actually responsible for making that specific protein found in the fiber. Through this process, the cDNAs encoding Masp1, Masp2, and an unidentified wrap protein were identified.

**Faculty Mentor:** Craig Vierra



**Poster # 18****Identification of a New cDNA that Codes for Wrapping Silk in Black Widow Spiders**

Gerard Wawrundeng

*Latrodectus hesperus* produces silk with high tensile strength and extensibility. This allows it to be up to five times stronger than steel, when compared on a weight-to-strength basis. There are no products on the market based on black widow spider silk because of the complications associated with its synthetic production. There is much to be revealed about the natural production of black widow spider silk. The purpose of this study was to combine genetics and proteomics in order to learn more about the natural production of silk in *L. hesperus*. A cDNA library was constructed from the silk glands of black widow spiders. cDNAs were randomly selected from the library in hopes of discovering novel silk genes. Isolation of each cDNA was accomplished through single-clone excision to obtain recombinant plasmids, transformation of the vectors into *E. coli*, followed by double restriction digestion to verify the presence of cDNA inserts. Successfully isolated cDNAs were sequenced, and then translated into a protein sequence. Unique protein sequences were then searched against a list of peptides, obtained experimentally from the black widow spider silk using MS/MS analysis. Eighteen of the initial 25 cDNAs were successfully isolated and sequenced. One translated cDNA was found to contain a predicted peptide that matched a peptide obtained from MS/MS analysis. The discovery of the cDNA containing the peptide sequence is evidence of its existence in *L. hesperus*. Further study of this cDNA may reveal more information on its role in silk production.

**Faculty Mentors:** Craig Viera**Poster # 19****Hunting for new spider silk genes in the black widow spider, *Latrodectus hesperus***

Jennifer Chau, Minh Tran and Anabelle Visperas

Spider silk has the potential to be used in many applications such as sutures, fishing nets, body armor and drug delivery systems. The purpose of the study was to find new silk genes by screening a cDNA library that was constructed from the silk-producing glands of the black widow spider, *Latrodectus hesperus*. To search for novel silk genes, we plated our cDNA library and randomly isolated individual plaques that carried different spider genes. In order to remove the spider genes from the viral chromosome, we coinfecting bacteria with a single library virus along with a helper phage to excise a portion of the viral chromosome that corresponded to the spider gene and embedded plasmid. Following the excision process, these plasmids were transformed into bacteria, inoculated, then purified using traditional plasmid miniprep procedures. Restriction digestion was done to verify the presence of a cDNA insert (spider gene) and the plasmids that carried cDNA inserts were subject to DNA sequence analysis. Sequences were then analyzed using bioinformatics programs. After the analysis of over 50 different spider cDNAs, we found three interesting genes. Translation of the retrieved cDNA sequences indicated we found a novel silk fibroin, a glue protein, and a variant of the egg case fibroin TuSp1.

**Faculty Mentors:** Craig Viera

**Poster # 20****Analysis of gene expression in *Trichomonas vaginalis* by DNA microarray technology**

Katelin Kehoe

*Trichomonas vaginalis*, the causative agent of Trichomoniasis, is one of the most common sexually transmitted diseases. Microarray experiments are useful for examining gene regulation. Studying how gene regulation changes in an organism in response to different conditions can help biologists explore a plethora of questions. For example, examination of how genes become up- or down-regulated in response to a particular drug can provide insight into the drug's mechanism of action. Microarrays are also used to compare gene regulation between different strains of microorganisms, thus exploring what makes the two strains different. In this study cDNA microarray chips were constructed from a library of *T. vaginalis* genes. Ultimately, these chips will be used in a variety of experiments, and we have begun two thus far. One is a comparison of two major lab strains of *T. vaginalis*, G3 and T1, G3 being more virulent than T1. Since these two strains share the same genome, the differences in virulence are attributable to differences in gene regulation. The second microarray experiment is a comparison of metronidazole-treated G3 versus DMSO-treated G3, which is important because the mechanism of action of metronidazole is largely unknown. For both of these experiments, the genes that are differentially regulated between the different strains or treatments will be sequenced. The functions of the genes will then be hypothesized by comparing them to homologous genes in closely related species. Future research will focus on metronidazole resistance in *T. vaginalis*, as it is becoming increasingly more common in this parasite.

**Faculty Mentors:** Lisa Wrischnik and Kirkwood Land**Poster # 21****Cloning and expression of a toxin-associated protein from *Clostridium botulinum* serotype E**

Raquel Sugino, Kristen Chang, Ajit Shokar, Steven Tu, Paul Sukhanov, Kristin Heller

*Clostridium botulinum*, the agent of botulism, infects several individuals each year as it raises concerns regarding bioterrorism and food safety. Current antitoxins can treat botulism's toxic effects, but prevention is preferable. This can be achieved through a sensitive and accurate detection of the toxin and/or its accessory proteins in food. To support this effort, botulism accessory proteins were recombinantly expressed and purified to generate monoclonal antibodies which may serve as probes for detecting the toxin. We cloned by PCR one such accessory protein, called p48, from *C. botulinum* serotype E. We first ligated the PCR product into the PCR 2.1 and then into the expression vector PQE80. Regulated expression was analyzed and confirmed via western blotting prior to protein purification.

**Faculty Mentors:** Lisa Wrischnik and Kirkwood Land

**Poster # 22*****In vitro* effects of meclonazepam analogues on the growth of *Trichomonas vaginalis***

Cathy Yen, Daniel Yee, and Erica Lee

*Trichomonas vaginalis* is a facultative anaerobic protozoan that causes trichomoniasis, a sexually transmitted disease in humans. Currently metronidazole is the only FDA-approved antibiotic for trichomoniasis. To counter the emergence of metronidazole resistant strains of *T. vaginalis*, there is a need to find alternative drug treatments. Compound susceptibility assays were conducted on the T1 strain of *T. vaginalis* using nine meclonazepam analogues that were previously evaluated against *Schistosoma mansoni*. All nine compounds inhibited growth of *T. vaginalis* when tested at a preliminary concentration of 10  $\mu$ M. Of the nine compounds, MACLO-DIF and MACLODY-3 were the most effective at inhibiting *T. vaginalis* growth, with IC<sub>50</sub> concentrations below 1.000  $\mu$ M. MACLODY, MACLODIC, MACLOBR, and MACLONAC had IC<sub>50</sub> concentrations under 2.000, and MACLOETPH was the least effective inhibitor with an IC<sub>50</sub> concentration of 3.210 $\mu$ M. Further testing is necessary to determine the mechanism of action, as well as structure-activity relationships.

**Faculty Mentors:** Lisa Wrischnik and Kirkwood Land**Poster # 23****Chloroquinolyl Analogues as Potential Treatments for *Trichomonas vaginalis***

Daniel Yee, Cathy Yen, and Erica Lee

*Trichomonas vaginalis* is a facultative anaerobic protozoan that causes Trichomoniasis, a sexually transmitted disease in humans. Currently metronidazole is the only FDA-approved antibiotic for Trichomoniasis. To counter the emergence of metronidazole resistant strains of *T. vaginalis*, there is a need to find alternative drug treatments. Compound susceptibility assays were conducted on the T1 strain of *T. vaginalis* using seven chloroquinolyl analogues that were previously evaluated against *Plasmodium falciparum*. All seven compounds inhibited growth of *T. vaginalis* at the highest concentration tested (10  $\mu$ M). Of the seven compounds, A-125, A-139, A-126, A-127 were the most effective at inhibiting *T. vaginalis* growth, having IC<sub>50</sub> concentrations ranging from 2.2-2.5 $\mu$ M. A-132 and A-131 were less effective with IC<sub>50</sub> concentrations of 3.059 $\mu$ M and 3.475 $\mu$ M respectively. A-120 was the least effective inhibitor with an IC<sub>50</sub> concentration of 5.293 $\mu$ M. Further testing is necessary to determine structure-activity relationships.

**Faculty Mentors:** Lisa Wrischnik and Kirkwood Land

**Poster # 24*****In vitro* Effect of Sanguinarine and Chelerythrine on *Trichomonas vaginalis* Trophozoites**

Kirstin M. Low, Lauren M. Conway, Raquel K. Sugino, and Nimisha N. Patel

*Trichomonas vaginalis* is a parasitic protozoan that causes the STD trichomoniasis showing physiological symptoms in women and asymptomatic symptoms in men. To date, there are two FDA approved treatments for this disease, metronidazole and tinidazole. Currently, patient strains are becoming increasingly resistant and implements for new drug targets are needed. In this study, sanguinarine (SANG) and chelerythrine (CHE) were analyzed as additional chemotherapeutic treatments for trichomoniasis. This experiment aimed to assess the inhibitory effects of SANG and CHE on human trichomonad strains T1 and G3. Multiple drug assays with varying concentrations of SANG and CHE were performed to estimate the IC<sub>50</sub>, the concentration of the drug that would inhibit the growth of the parasites by 50%. The cell lines were tested in three environmental conditions: aerobic, anaerobic, and anaerobic with no ascorbic acid. Ascorbic acid is an antioxidant with proposed negative effects on SANG and CHE potency. Its activity was used to help discover the SANG and CHE mechanism. Cells were incubated for 24 hours (assay counts +/- 1 hr.) at 37°C. IC<sub>50</sub> molarities were skewed towards a narrow degree ranging from 1-10µM exemplifying the potency. The data showed a trend of decreasing percent survival parallel to the increase of concentration of SANG and CHE. Previous data showed G3 strains were slightly more virulent than T1. In aerobic and anaerobic conditions, T1 had higher survival rates than G3. In anaerobic no ascorbic acid conditions, T1 generally had less survival than G3. The absence of ascorbic acid demonstrated increased SANG and CHE potency. This experiment utilized very low concentrations of SANG and CHE with high effectiveness. The data supports the hypothesis that these are possible drugs to go further in analysis as alternative forms of treatment.

**Faculty Mentors:** Uta Hellmann-Blumberg, Smita S. Makar, Lisa A. Wrischnik and Kirkwood M. Land

**Poster # 25****Characterization of Serine Proteases in *Trichomonas vaginalis***

Richard Tran, Raquel Sugino, Marilynn Chow, Paul Geurts, Brad Butcher, and Jessica Cicone

*Trichomonas vaginalis*, an anaerobic protozoan parasite, causes trichomoniasis the most prevalent non-viral STD. While males are usually asymptomatic, females may have symptoms such as inflammation and vaginal secretions. Trichomoniasis is also a cause of many complications during pregnancy. Infection is treated with metronidazole or tinidazole. However, there is a need to develop alternative chemotherapies because of drug resistance. Serine proteases have been shown to be virulence factors in various parasites such as *Toxoplasma gondii* and *Entamoeba histolytica*. *T. gondii* invasion of host cells has been shown to be blocked by serine protease inhibitors. *T. vaginalis* has been suspected to have serine protease activity, but this enzyme has not been studied in any detail. We have searched the *T. vaginalis* genome database and found potential serine protease candidate genes. We have cloned 10 of these genes using PCR with the goal of ultimately expressing these genes for recombinant protein expression. Currently we are also studying the effect of serine protease inhibitors on *T. vaginalis* growth.

**Faculty Mentors:** Lisa Wrischnik and Kirkwood Land

**Poster # 26*****In vitro* effects of a chemical inhibitor targeting superoxide dismutase on the growth of *Trichomonas vaginalis***

Chris Wakukawa, Larry Chen, Nathalie Foray, Raquie Sugino, and Padraick Dornbush

*Trichomonas vaginalis* is a protozoal pathogen infecting both men and women, causing the disease trichomoniasis, one of the most common sexually-transmitted diseases. Currently, there are only two FDA-approved treatments, metronidazole and tinidazole; however, drug resistance remains a threat in treating the disease. Due to few treatments available, we are screening new compounds to see if they inhibit the growth of the organism. This study focuses on the role of superoxide dismutase on *in vitro* growth. Superoxide dismutase is an enzyme that eliminates harmful superoxide ions that damage cells. Using the SOD inhibitor, sodium diethylthiocarbamate trihydrate, we are testing whether treatment with this compound can inhibit *in vitro* growth of *T. vaginalis*; as well as determine whether abrogation of SOD activity increases metronidazole susceptibility of the organism. This work may highlight new opportunities for alternative chemotherapies against *T. vaginalis*.

**Faculty Mentors:** Lisa Wrischnik and Kirkwood Land

**Poster # 27*****In Vitro* Effects of a Vinyl Sulfone Cysteine Protease Inhibitor on a Virulent Strain of the Bovine Parasite *Tritrichomonas foetus***

Cynric Cho and Rhobe Bulahan

*Tritrichomonas foetus* is a protozoan responsible for bovine trichomoniasis. Trichomoniasis in cattle is a disease characterized by self-limitation, and infects both male and female cows, with bulls being asymptomatic chronic carriers of the disease. Similar to trichomoniasis in humans, the protozoan can be treated *in vitro* using nitroimidazole drugs and its derivatives. However, nitroimidazole drugs are no longer approved by the FDA for treatment of bovine trichomoniasis. Currently, it has been suggested that cysteine proteases are related to the pathogenicity of the parasite and as such, could become a promising drug target for *T. foetus*. The lack of pharmacological treatment for the disease as well as the impracticality of current control methods contribute to the necessity for new, more effective chemotherapeutics in dealing with the dilemma of the cattle industry. In order to support the effort we have screened, *in vitro*, a vinyl sulfone peptidomimetic cysteine protease inhibitor, K11777. In addition, IC<sub>50</sub> values for this compound have been determined, and the compound has shown promise of inhibiting growth of *T. foetus*.

**Faculty Mentors:** Lisa Wrischnik and Kirkwood Land

**Poster # 28*****In Vitro* Effects of Alternative Chemotherapeutics on a Virulent Strain of the Bovine Parasite *Tritrichomonas foetus***

Cynric Cho, Rhobe Bulahan, John Cabrerros, Katherine Grutas, Padraick Dornbush

*Tritrichomonas foetus* is a protozoan responsible for bovine trichomoniasis. Trichomoniasis in cattle is a disease characterized by self-limitation, and infects both male and female cows, with bulls being asymptomatic chronic carriers of the disease. Similar to trichomoniasis in humans, the protozoan can be treated *in vitro* using nitroimidazole drugs and its derivatives. However, nitroimidazole drugs are no longer approved by the FDA for treatment of bovine trichomoniasis. Currently, trichomoniasis has a prevalence of disease as high as 16% in natural-breeding range herds and the lack of pharmacological treatment for the disease as well as the impracticality of current control methods contribute to the necessity for new, more effective chemotherapeutics. In order to support the effort we have started to screen, *in vitro*, a compound library of 3,4-dichloroaniline amides, of which only a couple of shown promise for inhibition of parasite growth. Further trials of these compounds will confirm which compounds show promising ability at inhibiting parasite growth, at which point IC<sub>50</sub> values will be determined for these compounds, as well as structure-activity relationships.

**Faculty Mentors:** Wade Russu, Lisa Wrischnik, and Kirkwood Land

**Poster # 29****3,4-Dichloroaniline Amides as Anti-trichomonal Agents: Structure Activity Analysis of a Compound Library *in vitro***

Ryan Nguyen, Henry Nguyen, Daniel Sorrick, Raymond Garcia, Chris Wakukawa, Larry Chen, Elizabeth Chang, Jessica Cicone, and Padraick Dornbush

*Trichomonas vaginalis* is a protozoan that causes the sexually-transmitted disease trichomoniasis in humans. The organism infects both men and women; however, men are asymptomatic, making treatment difficult between partners. Today, trichomoniasis is one of the most common sexually-transmitted diseases. The current FDA approved treatment is metronidazole. However, there are strains that display resistance to metronidazole, pressing the need for alternative chemotherapies to be found. To support this effort, a compound library of 3,4-dichloroaniline amides were screened *in vitro* against the T1 and G3 strains of the organism. Of the twenty-one compounds, six were effective at inhibited growth on the G3 strain and seven were effective on the T1 strain.

**Faculty Mentors:** Wade Russu, Lisa Wrischnik, and Kirkwood Land

# Senior Engineering Design Presentations





## **Bioengineering**

### **Not All Alloys Are Created Equal: Recovery Temperature Testing Apparatus (RTTA)**

Tiffany Mateo, Joyce Opiniano, Olga Sirovskaya, Andrea Staggs, Gwendolyn Upson

Nickel titanium or Nitinol is a shape memory alloy, which is a material that "remembers" its shape, and can be returned to that shape after being deformed. This shape memory property is a result of a reversible, solid phase martensitic transformation that occurs at a certain transformation temperature. When Nitinol is deformed, it will remain in that shape until heated above its transformation temperature, at which time it will return to its original shape. These properties make Nitinol uniquely suited for a variety of applications, from aerospace to medical devices. Nitinol is commonly used in dentistry, for orthodontic brackets and wires, and for endodontic files, used to clean and shape root canals. Nitinol is typically composed of approximately 50 to 55.6% nickel by weight. However, small changes in the composition can change the transition temperature of the alloy significantly. A team of University of the Pacific bioengineering seniors collaborated with the American Dental Association (ADA) to create a testing apparatus that could be used to determine Nitinol transformation temperature in compliance with ASTM F 2082 – 06 “Standard Test Method for Determination of Transformation Temperature of Nickel- Titanium Shape Memory Alloys by Bend and Free Recovery.” The standard states that a straight sample must be deformed in a semi-circle and heated back into its original shape. The transformation temperature is determined by analyzing graphical data of temperature versus displacement of the sample. With the Recovery Temperature Testing Apparatus (RTTA), the transformation temperature of any Nitinol sample can be easily and accurately determined.

**Faculty Mentor:** James Eason

### **Automatic Pill Dispenser**

Nick Rummel, Andre Bayati, Kamaldeep Singh, and Michael Jue

The automatic pill dispenser is designed to remind people to take the prescribed medication at the appropriate time. It will assist nurses in dispensing the correct quantity of pills for an individual patient at specified times. This device will keep the drugs for an individual patient while having an alarm that will sound when it is time for the drug to be administered. An LCD screen will show the total amount of pills in the device along with the amount of pills to be dispensed. There will be an electronic motor that will rotate an arm and dispense the appropriate amount of pills. The LCD screen will decrease by one each time a pill is dispensed, keeping track the amount of pills currently in the container. The dispenser will have the capability to contain different compartments to dispense a variety of pills. Currently only one compartment is being assembled; however, additional compartments will be designed in a similar manner. These compartments will be able to stack together so multiple compartments may be used. If the medication were to change or if there is a buildup of pill residue, the compartments may be removed, washed with soap and water, and then a new drug may be administered.

**Faculty Mentor:** James Eason

## **Project FFR**

Patrick Balingit, Thaer Elareer, Van Huynh, Dorothy Phan, and Edison Tongson

FFR (Fractional Flow Reserve) is a clinical measurement that allows the diagnostic of stenosis (narrowing of the blood vessels). It is calculated by dividing the maximum myocardial blood flow in presence of a stenosis by the normal maximum blood flow. Volcano Corps have asked us to provide assistance regarding one of their diagnosis devices, namely the FFR ComboMap System. What is needed is a way for their engineers and testers to validate the accuracy of the system in case there is a change in the algorithm. The intended device is an FFR Calibration System to be used in conjunction with the ComboMap System during verification and validation tests. We will be using LabVIEW as the program and the ELVIS II Board. The LabVIEW program will have an interface that allows the user to choose a specific FFR value. This FFR value will translate into two independent signals for the distal and proximal flow rate. The mean distal flow value will dip depending on the FFR value chosen. The two signals are then displayed in the front interface on a waveform chart. The two signals that are produced will then be outputted from the ELVIS II board to the ComboMap System. These signals will then be tested on the FFR device on the software provided by the client as well as their ComboMap System. Our program will be used as a calibrating device to see if the machine is reading what it is supposed to read.

**Faculty Mentor:** James Eason

## **Team Reachout: Creating Memories that Last a Lifetime**

Josephine Trinh, Zack Kimura, Chris Stanton, and Jocelyn Gray

Team Reachout has partnered with the ARC San Joaquin, a nonprofit organization that supports persons with developmental disabilities, to make their memories last a lifetime. This project focuses on helping those participants that are wheelchair-bound use a video camera with ease, by utilizing a user-friendly remote controlled rotating video camera platform. The device features four main components: an LCD screen, user-controlled pan and tilt camera platform, the user-friendly remote control and the wheelchair mounting system. From the remote control, the user will be able to rotate the camera vertically and horizontally, start and stop recording, and zoom in and out. The remote features large buttons with easy to read, familiar symbols which clearly depict the function of each button. The motorized camera platform follows the directions of the user through use of the remote control. The user is able to view what they are filming with ease by looking effortlessly at a 7" LCD screen, mounted in front of their very eyes. The system is mounted to the wheelchair through use of a structured series of bars and a clamping system. These four components together "Reachout" to create memories today which last a lifetime.

**Faculty Mentor:** James Eason

## **Manually Powered Otoscope**

Dustin Dovala and Jeff Lee

One of the most basic medical diagnostic tools is the otoscope – the device used to examine the ear canal. Unfortunately, many doctors in remote and developing regions do not have easy, ready access to electricity or batteries, rendering them unable to use this tool. We have designed an otoscope that is powered completely by moderate shaking and which uses a low power, but very bright, LED. Our otoscope is also designed to withstand harsh environmental conditions, such as very high and very low temperatures as well as high degrees of humidity. We are going to be testing our otoscope under various conditions, such as humidity and moisture, to determine how effectively it will still run under these harsh conditions.

**Faculty Mentors:** James Eason

## **Computer & Electrical Engineering & Engineering Physics**

### **Cavendish Gravity Experiment: A Setup Modification**

Tabitha Voytek, Casey Carlin, Patrick Hall, and Ross Bennett

One of the experiments performed in the Advanced Physics Laboratory course offered by the University of the Pacific Physics Department is the Cavendish Gravity experiment. This experiment is designed to measure the universal gravitational constant, which relates gravitational attraction between any two objects and the mass of the objects. Using a "Gravitational Torsion Balance", a system of masses is rotated due to gravitational attraction. To measure this rotation, a laser beam is reflected off a mirror mounted on the system of masses and projected onto a screen or wall. Our addition to this experiment is a system to capture the position of the laser beam as a function of time. Using a webcam, we were able to track the laser beam and pass that information into a computer. A program was written to translate webcam information into position and to provide a user interface. In addition, a blue screen was built to aid in capturing the laser position. This allows us to make sure that the only red in the image captured by the webcam is from the laser, making it easier to track. The screen also includes a set of green LEDs that are placed a set distance apart to help translate the position that the webcam reads, which is in pixels, to the actual position in centimeters. Now that we have made this addition to the Cavendish Gravity Experiment Apparatus, it can be used in future offerings of the Advanced Physics Laboratory course.

**Faculty Mentor:** James Hetrick

### **The Wonderlic Motion Contraption- Exercise Repetition Counter**

Ra Meas, Alex Perez, Rashid Al-Naimi, David Van Teslaar

Imagine doing an exercise without having to remember how many repetitions you have done. Are you curious to know? There is a device called the exercise repetition counter brought to you by the fantastic four University of the Pacific students whose background are in Computer, Electrical, and Engineering Physics. Now you can exercise, while you enjoy your music and do the correct amount of rep counts and have a device keep track. How can this be possible? Researching materials and ideas for the device took about two weeks, while purchasing and testing took another four to six weeks. The group had to figure out methods to alert, display values, detect motion, while being affordable, efficient (low battery consumption), and simple to use. Here is some technical information for the tech junkies. The device uses infrared motion sensor (Sharp GP2Y0D340K) to monitor body movement, i.e. arms, legs, etc. The brain of the device is a PIC18F2455 microcontroller which controls the entire device. A Samsung disk coin-type vibration motor is to alert the user that they have completed the repetitions. A Newhaven LCD is used to output the visual display. There are resistors, voltage regulators, 9V battery, push buttons, transistor, and an oscillator to control the clock speed of the device. Want to simplify your exercise routine or want to know more details about the device? Just stop on by our booth and test it out for yourself.

**Faculty Mentor:** Ken Hughes

### **Energy and Power**

Sean Steven Girard, Mike Lagomarsino, Thomas McDonald, Vicky Pang, Sean Pippin

The purpose of this project is to design, implement, and demonstrate a device that is capable of measuring power and energy consumption of a small household appliance. The design will display the measured voltage, current, power factor, and average power on an LCD display. Energy and power consumption will be plotted using software on a computer. A specific time frame can be specified by the user to start data collection and will be portable for ease of use as a consumer product.

**Faculty Mentor:** Rahim Kohie and Cherian Matthews

### **Save Money on Your Energy Bill: Power/Energy Meter Design by Team MSJ^2**

Marc Sakai, Seyla My, Jonathan Crawford, and Justin Ouye.

Energy is money and the usage of electrical appliances has dramatically increased. Companies and consumers can take a proactive approach in efficient energy usage in the form of a device that can monitor the appliance's voltage, current, and power factor, and may lead to saving money and the environment. This project involves the design and implementation of such a device. The system encompasses the circuitry used to collect data from the appliance and display it on an LCD display with an accuracy of  $\pm 1\%$  for voltage measurements and  $\pm 2\%$  for current measurements. In addition, the device is connected to a PC, and takes a time duration input from the user, and generates a graph where the user can see a visual depiction of the power and energy absorbed. The use of this device provides valuable information that can help people make better decisions when it comes to using/designing energy efficient appliances.

**Faculty Mentor:** Cherian Matthews and Rahim Kohie

### **Knowledge Is Power: Regaining Control from the Rebel Appliance**

Brandon Blair, Nate Mackey, Kulwinder Samra, and Bryan Weimer.

Electrical appliances serve important functions in our everyday lives, yet we have very little understanding of how they function. In light of our energy crisis, people are becoming more conscious of buying energy efficient products, but still lack a comprehensive knowledge of how much energy their appliance actually consumes. The purpose of this project is to supply a means by which the average consumer can better quantify the energy use of their household appliances, including the monetary cost associated with them, so as to gain the knowledge they would need to effectively cut back on their energy usage. The project has an added feature that allows it to communicate with your personal computer so that you can monitor energy usage over time. This allows consumers to truly see how much energy is being consumed, even when the appliance is in a low-power state, and track your progress in reducing your energy usage.

**Faculty Mentor:** Cherian Matthews and Rahim Kohie

## **Mechanical Engineering**

### **iFire Automated Fire Suppression System**

Benjamin Alldritt, Liza Boyle, Justin Canty, and Douglas Nelson

Residential fires kill over 3000 people per year in the United States in addition to significant, if not total, loss of property and possessions. Present fire suppression systems delay the spread of the fire until the rescue personnel can fully evacuate the building and begin a secondary deluge of water. The iFire system aims to enhance current fire suppression systems by actively engaging the fire to prevent harm to life and property by augmenting a motorized system with fire detection sensors. This will allow for localized fire control in a particular room and alert firefighters where the main fires are located. One type of sensor that could be used in the system is a near Infrared sensor capable of detecting flame phenomena. In the market of low-cost fire sprinklers, the near Infrared sensors have an advantage of being inexpensive and easy to manufacture. This project chose to use near Infrared sensors with a specific wavelength detection of 940 nm and substituted near Infrared LED emitters for an actual fire. Combined with the sensors is a pan and tilt system to direct the water jet at the LED emitters. With the majority of fire suppression systems being simple deluge systems, the iFire team found that the market for automated systems was untapped and so research and development in this area could lead to new breakthroughs in fire suppression.

**Faculty Mentor:** Kyle Watson

### **Mars Rock Crawler**

Brandon Coonce, Gabriel Corona, Jared Engelbrecht, and Jonathan Thomas

This project aims to design and fabricate a vehicle to compete in the 2009 ASME Student Design Competition at San Jose State University. The remote-controlled vehicle must navigate a course, collect rock samples and return the rock samples to a designated location.

**Faculty Mentor:** Kyle Watson

### **Omni-Directional Vehicle**

Abdullah Al-Attal, Matthew Furlo, James Gannatal, and Christopher Hewitt

This projects aims to design and fabricate a prototype vehicle that is capable of moving instantaneously in any direction without stopping or changing the orientation of the wheels.

**Faculty Mentor:** Kyle Watson

**Principles of Engineering Machine**

Robyn Nariyoshi, Clement Nguyen, Tejpai Sekhon, James Smyth

To design and fabricate an interactive unit that demonstrates the many principles learned and practiced by mechanical engineering students and professionals. CAPD funding is being used to fabricate this design.

**Faculty Mentor:** Kyle Watson





# Senior Art & Design Exhibition

“MMIX Media”



## The Object's Function

Lauren Carter

I make pots in response to an attraction to the beauty of form and a fascination for materials and process. I believe the ceramic vessel should be pure, honest, and simple – utilitarian forms requiring a high level of craftsmanship and relationship between the artist and material. The transformation of decomposed matter into almost crystallized stone is powerful to me. The responsive nature of clay to the touch and its ability to record process and time is enthralling. Ceramic pottery is a unique tradition that has touched almost every civilization known to man and continues to appeal to us even amid the fast-paced high-tech culture of today. Being a part of this tradition also drives my interest in ceramic pottery. For a potter, art is a lifestyle: creating forms with purpose to be used and shared. I align myself with such classic potters as Hamada and Mackenzie. Their ceramic works are readily accessible and easily approachable by the ordinary person and does not require intellectual depth to be appreciated.

My current work is an exploration of form. Though I have built many different kinds of vessels they fall into traditional categories: bottles, bowls, and cups. All I am choosing to accomplish is a formal analysis and investigation of the dialogue between function and form.

**Faculty Mentor:** Daniel Kasser

## Silent Stories

Eliana Cetto

Eliana Cetto's photography and video series **Silent Stories** is a tableaux expression of a tortured fairytale character. Here, Alice characters have fallen down the rabbit hole, but instead of encountering a wonderland, they are escaping a claustrophobic, antiquated nightmare. In Unwonderland, innocent paper puppets try to flee their two-dimensional lives, and transform into living dolls. Their mannequin appearance and child-like vulnerability create personalities that meld traditional Alice and Snow White with a gothic damsel in distress. The emotional and narrative nature of the series explains the title Silent Stories, conveying preverbal messages of pain, longing, sorrow, love, and death.

The transformation from marionette to girl is depicted as frantic, ghostly, and dream-like. The insertion of self-portraiture in the film adds to the dimensionality of the fairytale characters, becoming expressions of the artist's innermost dialogues. Silent Stories suggests the possibilities of a postindustrial wasteland of obsolescence, while referencing contemporary modernity. Thus, the viewer is guided through an adventurous transformation of a beautiful and horrifying, postmodern voyage.

Through the use of selective coloring and layers of texture, the artist is not only able to create an image of tension, similar to influential artists like Joel Peter-Witkin, Robert Park Harrison and Floria Sigismondi, but also creates a barrier from the voyeuristic viewer. Here, the dialectical beauty and damaged appearance of the digital prints and video, simultaneously lure and deflect the gaze from the protagonist, creating a deterrent from access to the fantasy world.

**Faculty Mentor:** Daniel Kasser

## **Coyote Speaks**

Katherine Draeger

My paintings are an exploration of my spiritual relationship with Coyote, who becomes an antidote for urbanization, materialism and waste in contemporary society. For me, Coyote is a reconnection with an ancient spirituality: the belief in Coyote as a creator and a link to nature. Coyote keeps me connected to the earth, from which all creatures were born equal and natural. He represents vitality and adaptability in the face of change. Coyote is tenacious, surviving disaster or extinction.

Through my research of Native American religions I have learned that it is customary for adolescents to go on a vision quest. They have no food or water and remain alone for three days until they are given a vision of their animal totem. Animal totems are messengers of the Great Spirit and bring with them power and knowledge to guide those who open their minds to them. They are a connection to all living things and facilitate harmony and peace with nature. College has been a catalyst for my own self-discovery, especially in the area of religion.

My life has been a struggle with spirituality, a struggle with the belief in a higher power, faith, and religion. Recently, I experienced something like a vision quest. A fierce spiritual bonding occurred as I listened to wild coyotes calling to each other. Their voices resonated and spoke to me. From that time, the Coyote has become a subject of my paintings. The figure of Coyote represents myself. The images are meant to describe the journey of the relationship between Coyote and me.

**Faculty Mentor:** Dan Kasser

## **Imagining the Spiritual**

Jessica Herrera

The subject of my work is the concept of spirituality in art and how it manifests itself as the catalyst for the creation of art works. This can and should vary from person to person, but can also be phenomenally linked to different theories on life, religion, structure, the universe and the imagination. Many people meditate, distancing themselves as much as they can from the distractions of the world, while others meditate to reach a point of uninhibited creativity. My mission as an artist is to explore abstract art as a form of spiritual refreshment during a time of materialism and economic skepticism.

The antecedents of my work are the abstractionist painters of the early 20th century. Wassily Kandinsky, perhaps the most influential artist and theoretician of the early 20th century and a proponent of improvisational painting, emphasized the formal properties of pure color and abstract composition as a dialect that represented the confluence of visual art and the artist's spiritual quest.

My art works is searching for analogs to spiritualism through painting by synthesizing iconography and formal elements into images that reference the release of energy, characteristic of the transformations and transfigurations, found in our modern-world of biological, mechanical and nano engineering. I hope to inspire a sense of wonder in my viewers – prodding people to question the presence or absence of spirituality and how it manifests itself in the world which they choose to exist.

**Faculty Mentor:** Daniel Kasser

## **Obtainable Sustainable**

Susannah Pilcher

This series of artworks is an investigation of man-made materials and sustainable practices, which inspire new ways of analyzing the potential of recyclable materials. The new forms that result from the use of pliable geometric forms such as plastic bottles, or Styrofoam shipping materials create an open-ended opportunity. The artworks recyclable materials revealed from my inquiry are translations, intensifications and responses to the reusable and decorative potential of these materials.

In an effort to create a visual statement in response to waste of resources, I have attempted to re-purpose objects such as water bottles, styrofoam, and toilet paper tubes into unconventional but practical light sculptures. Using common materials and tools I aspire to generate worth and appeal out of everyday items. While maintaining the inherent quality of the materials, I have also chosen to focus on energy conservation through the use of CFL bulbs.

The use of these materials conveys a concept that is pertinent to contemporary life and communicates the impacts our current and past generations have had on the environment. Through current events involving global warming and the economic recession these issues become more prevalent each day. The discovery of new resources marks the validity of contemporary thought, although our current progress is uncertain.

My artworks are intended to prompt viewers to envision the possibilities of recycling and reusing and to question how much of what they throw away is actually trash. I hope to ultimately inspire a connection between the material world and the environment, creating artwork with practical and social relevance.

**Faculty Mentor:** Daniel Kasser

## **A New Way of Living**

Gina Polana

You can say that my art is craft or you can say that my art is design. No matter what way you put it, I call it a lifestyle. I believe the embellishment of ordinary utilitarian objects enrich our lives. It is my goal to revisit the importance of craft to the world we live in. This is not an easy decision in the art academy. My mission and work is similar to that of Martha Stewart. We teach broad and practical life skills for food, gardens, and the home.

The subject of my thesis is the artful application of crafts and the development of a book complete with projects for the home, as well as friends and family. They deliver the enrichment of the arts into every day life. My book contains a group of projects that I have designed complete with photographic illustration, sequential instructions, and material list and sources.

With America's economy going into a depression, it is important that people revisit the value of homemade craft. Not only do the projects in my book help save on money but they include helpful skill for living apart from the consumer market. Homemade craft is the backbone of not only artists but the retail industry. With the economy dropping the quality of consumer products has been dropping too. It is my goal to help you see the importance and benefit that is still present today in homemade craft.

**Faculty Mentor:** Daniel Kasser

## **Functional Ceramics and Lidded Forms**

Lisa Tran

The subject of my senior thesis work is the Lidded Jar and Lidded Box and the functional aspect of ceramics, storing materials such as memorabilia or herbs and spices. The lidded jar is found in all cultures across the history of humankind. I have attempted to reconcile my growing knowledge of ancient vessels with contemporary masters of the medium. My stylistic approach has evolved to emphasize tending simplified and minimal box and jar forms.

My ceramic work has many influences including historical and contemporary ceramics and my personal background in the culinary arts. From this life experience, I have directed my researched toward the utilitarian and functional vessel. I focused on what people use jars for, what kinds of jars are most useful, and why people use ceramic jars instead of any other medium. The taller cylindrical jars are for aromatic herbs and spices. The taller, narrower form keeps the aroma longer versus lower and wider forms that are for sugar and garlic cloves. Lidded box forms, of course, have a different function than the lidded jars. I intended the lidded boxes to hold jewelry, photographs, and relics without neglecting the quality of construction.

**Faculty Mentor:** Daniel Kasser

## **Happily Ever After?**

### **The Commercialization of Fairytales and the Shaping of Feminine Identity**

Brandi Young

This installation is based on the deconstruction of feminine identity through fairytales. As young girls, fairytales become a dream world in which they form unrealistic expectations that may not be obtainable as adults. Through these fairytales young girls form an image of themselves as beautiful princesses and damsels in distress; an image that is further perpetuated by society.

The principle icon of my installation is a castle form. The large stone castle and soft, flowing, white curtain entrance are to capture the viewer's interest and allow them to feel a sense of enchantment and wonder. Upon entering the castle one is immediately transported to another space through an interaction with six photographs, a mirror and soft feminine material. The mylar mirror hangs opposite the doorway and distorts the viewers reflection. The photographs are overlaid with quotes taken from Disney fairytale movies and statistics about women's lives. This juxtaposition is designed to confront the viewer with a collision between truth and fantasy. This effect is further heightened by an overlay of sound, periodically taunting the viewer.

My artwork is designed to support my experience and my philosophy that women should be strong-willed, intelligent individuals. These characteristics are not supported enough in today's world of childhood education and popular culture. Young girls need to be aware of struggles they may face one day. With my work I hope to raise questions in my viewers mind, perhaps even to force them to confront issues that they try to ignore.

**Faculty Mentor:** Daniel Kasser

# Junior Studio Seminar Exhibition

“Your Piece of the Puzzle”





### **Three Person Vessel Xylophone**

Brooke Cashion

My Three Person Vessel Xylophone installation is intended to inspire the community to work together cooperatively to solve local problems. I approach this with in a playful manner to reduce the complexities of teamwork. I want people to experience cooperation on a very basic, pure, and equal level. The three pottery forms employed – bowls, plates and cups – were chosen for their connections to both dinnerware and the unifications around a meal. The installation requires three members of the audience to engage and coordinate kinetically with one another to perform a task at the same pace. The task is to activate a melody created by pottery forms, strung from the ceiling, by pulling on a device that will raise a ringer to strike each pot as it ascends. I think that the kinetic coordination towards the goal of creating a melody exemplifies a fundamental, child-like level of cooperation. The goal of this installation is to connect play and learning so as to tap into our essential and valuable capacity for mutual cooperation and consequently, unity.

**Faculty Mentor:** Merrill Schleier

### **Atonement**

Yolanda Cunningham

In my current series Atonement, I came up with subject matter that would not only interest me but would also convey a universal message. These mixed media paintings represent a deep and private part of me. I see in these works a sense of guilt for the sins that I committed against my son when he was a just a child. I try to show that while the actions of one's mother may cause heartache, it is ultimately the choices that a child makes that will eventually decide the path his or her life will take. Even so, we as Christian parents are obligated to provide an environment that nurtures our children in the will and way of God. Such nurturing will enable children to make faithful choices along life's journey. What I see in my work is my apology to my son, but a different person may see the loss of life in an actual war, or someone he or she hurt as a child.

The theme of my project is also war. War does not always have to be physical; it can also be emotional. In these pieces, I use many different tools to get the effects that I desire. For the first time, I have experimented with different techniques by using mixed media such as oil paint and acrylic. While experimenting with different techniques, I also used real dirt and sand and toy planes to give the effect of a soldier in Iraq.

**Faculty Mentor:** Merrill Schleier

**Miscommunication**

Christine Strain

In my current painting series, Miscommunication, I observe the ever-increasing presence of domestic technology and its all-too-often ill effects. For example, texting has become a world-wide craze. But since this efficiency has become available, it has become almost normal for people to choose to text in a situation even if speaking to the party were a feasible option. I feel that people's dependency on technology serves to denigrate the physical aspect of relationships. However, throughout my research, I realized that most technology and communication companies claim that their products help to enrich relationships between people. In my works, I chose to use versions of these slogans as titles placed in direct juxtaposition with images of people using forms of technology and losing their physical selves in the process. It is my hope that people will see my work and feel compelled to take a look at the quantity of technology use in their own lives and to more carefully preserve the physical and personal relationships with other people.

**Faculty Mentor:** Merrill Schleier

